PROJECT FACT SHEET

CONTRACT TITLE: Characterization of Oil and Gas Reservoir Heterogeneity - Annex VII

DATE REVIEWED: 01/12/93 **DATE REVISED:** 12/29/92

OBJECTIVE: The objective of this cooperative research project is to comprehensively characterize Alaskan petroleum reservoirs in terms of their reserves, physical and chemical properties, geologic configuration in relation to lithofacies and structure, and development potential.

ID NUMBER: DE-FG07-90ID12839

B & R CODE: AC1505100

CONTRACT PERFORMANCE PERIOD:
11/01/89 to 03/31/93
PROGRAM: Hvy Oil
RESEARCH AREA: Gas

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PROJECT SITE:
Fairbanks, AK

SCHEDULED MILESTONES:

Compile geological description of reservoir petrophysical properties.
Compile data on the physical properties of reservoir fluids.
Compile information on general formation properties, which includes fluid injection & production characteristics.
Develop a database of rock, fluid, and general development properties of each formation.
Final Report. 06/93

FUNDING (1000'S)	DOE	OTHER	CONTRACTOR	TOTAL
PRIOR FISCAL YRS	587	0	587	**1,174**
FISCAL YR 1993	0	0	0	**0**
FUTURE FUNDS	0	0	0	**0**
TOTAL EST'D FUNDS	**587**	**0**	**587**	**1,174**

PROJECT DESCRIPTION: The objective is to comprehensively characterize Alaskan petroleum reservoirs. This is to be accomplished through an intensive effort to identify and structure existing information, both published and unpublished, for use by developers, decisionmakers, and researchers; and to conduct analytical characterization studies of selected reservoirs to support a comprehensive final document. The expected results are: a) a database containing comprehensive information on the chemical and physical properties of oil reservoirs in Alaska, and b) a final report summarizing the detailed efforts of resource characterization and special studies of selected reservoirs.

PRESENT STATUS: The grant has been awarded and the project has been initiated. Current publications are: 1) The Role of Asphaltene Aggregation in Viscosity Variation of Reservoir Hydrocarbons and Miscible Processes; 2) Shallow Sands of North Slope Alaska and Their Hydrocarbon Potentials; 3) Petrologic-Petrophysical Relationships, West Sak and Ugnu (Brookian), Northern Alaska; 4) Modeling of Asphaltene Equilibria; and 5) An Improved Molecular Thermodynamic Model of Asphaltene Equilibria.

ACCOMPLISHMENTS: Reservoir characterization of the Kuparuk River reservoir, including analysis of approximately 50 wells, began in 1992 and is nearing completion. The analysis has focused on the oil-bearing Kuparuk Upper and Lower Sands. Calculation of various petrophysical properties within these sands, including porosity, water saturation, and net pay have been completed and will be integrated into the overall characterization of Kuparuk reservoir. Future steps include fault placement, mapping of petrophysical and geological properties, and completion of the Kuparuk reservoir characterization report. Analysis of approximately 20 wells adjacent to Milne Point has been completed in the same manner as at Kuparuk River but at the West Sak interval, rather than the Kuparuk. Petrophysical data derived from cores compare favorably with corresponding computed data. Future efforts will include fault placement and mapping of petrophysical properties at the West Sak interval across the area encompassing the analyzed wells. Extension of West Sak reservoir characterization to Milne Point is currently being considered as part of a more complete area-wide analysis. Fluid properties data have been compiled for Prudhoe Bay, Kuparuk River, Endicott, West Sak and Schrader Bluff reservoirs. Two thermodynamic models of asphaltene equilibria have been developed. Experimental study of effect of asphaltene deposition or rock/fluid properties is completed. The collection and update of Alaskan reservoir data for the TORIS database continued during this time period. The database for Endicott and Milne Point oil fields has been compiled and completed, and information regarding the Cook Inlet Basin reservoirs should be completed soon.

BACKGROUND: BPO is pursuing a research initiative in geoscience to characterize reservoirs into groups based on specific reservoir and fluid properties. This characterization supports research efforts to quantify reservoir heterogeneities that exist in reservoirs and which cause both severe reduction in oil recovery using primary, secondary and tertiary recovery technologies and significant errors in predicting potential oil recovery. In order for BPO to plan and implement an effective EOR research program, it is imperative that BPO have an accurate assessment of the remaining oil resource, the physical and chemical conditions in which it exists, and have knowledge of the technologies necessary to produce the resource. While this effort will provide a basic product in the public interest, supporting the DOE research program, it will also provide a direct public benefit in that data collected through this effort will assist public, in evaluating, and thus promoting, oil and gas recovery operations in Alaska. Lower-48 research, exploration, and drilling personnel will also be able to use the products of this research to compare the reservoir rock and fluid properties in Alaska to those being evaluated in the lower-48 states.